National Aeronautics and Space Administration

TDRS

GLOBAL COMMUNICATIONS WORLD CLASS RELIABILITY

The following are just some of the missions that rely on the TDRS constellation...

- **HSF**
  - The International Space Station (ISS)
  - ATV-3
- **Launch Vehicles**
  - Minotaur
  - Atlas V
  - Delta II and IV
- **Space Science Missions**
  - The Hubble Space Telescope (HST)
  - Fermi/GLAST
  - Swift
- **Earth Science Missions**
  - Aqua
  - Terra
  - Landsat
  - Landsat Data Continuity Mission (LDCM)
  - Aura
  - Solar Radiation and Climate Experiment (SORCE)
  - Tropical Rainfall Measurement Mission (TRMM)
  - Advanced Land Observing Satellite (ALOS)
  - Global Precipitation Mission (GPM)

... and many more!

As a vital information pipeline for space-based research and exploration ambitions, the TDRS constellation fulfills NASA's broadest communication demands. Now into its fourth operational decade, it's legacy of communications excellence is storied and grand. It has provided critical support to NASA's human space flight endeavors from the early beginnings of the Space Shuttle Program through ongoing International Space Station support today. TDRS provide communication support to many different science missions, as well as a number of launch vehicles. TDRS provide the ability to conduct real-time operations, for example satellite health monitoring and commanding, and to deliver high volumes of science data with great accuracy and very little delay.

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Tracking and Data Relay Satellite Project
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http://tdrs.gsfc.nasa.gov

www.nasa.gov

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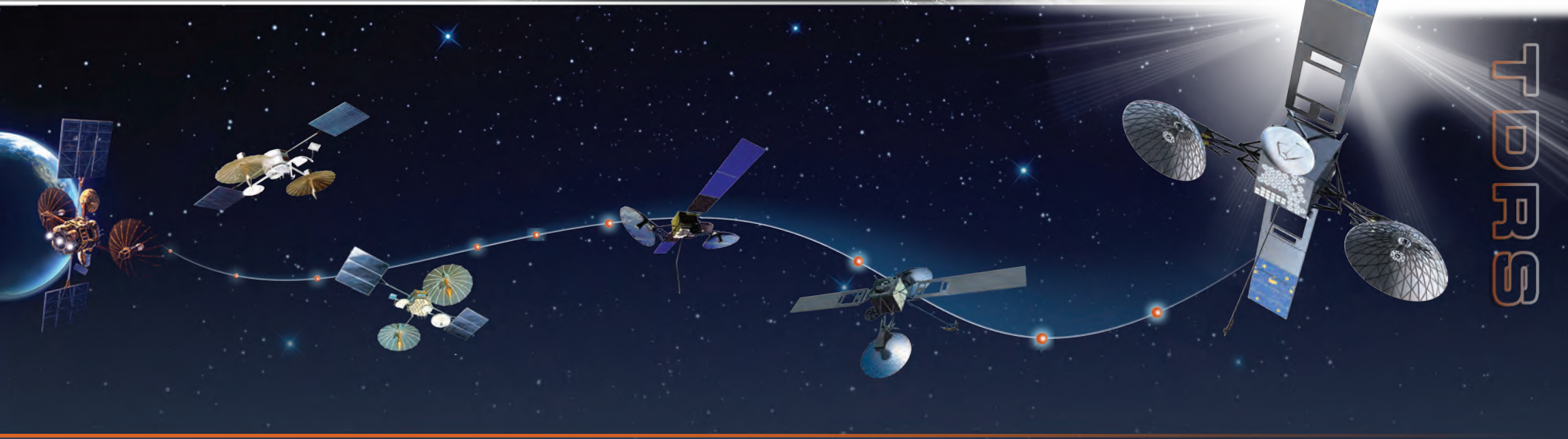
NASA's Space Network and the legendary TRACKING and DATA RELAY SATELLITE provides an array of global space-to-ground communication services with high performance and reliability. The Space Network consists of a constellation of TDRS in geosynchronous orbit that are connected in real-time with a powerful network of ground stations and data processing facilities. While both the development and operations projects are located at the NASA Goddard Space Flight Center in Greenbelt, Md., the TDRS ground segment is comprised of two ground terminals in White Sands, New Mexico and another in Guam. Together, they process data from the TDRS constellation and dispatch it out to a variety of customers.

TDRS — Today and Tomorrow ...



NASA's Space Network, stretches back to 1973. Using experience gained in the Apollo era and before, NASA began to think differently about its need to move information around the planet. Designed to handle what would become a flood of data, the program launched TDRS-1 in April of 1983.

NASA continued to add first generation TDRS spacecraft (which were built by TRW, later to become Northrop Grumman) until 1995. A total of seven were built and all became operational with the exception of TDRS-2 which was lost aboard Challenger.

From 2000 to 2002, NASA added three new spacecraft to the fleet, thus establishing the program's second generation. The H, I, and J spacecraft were built by Hughes (later to become Boeing), and continue to operate along with members of the now aging first generation.

TDRS supports a wide range of high-bandwidth synchronous and asynchronous communication schemes. On a single Ka-band antenna alone, the TDRS spacecraft are able to downlink at speeds of 800 megabits per second; which is equivalent to downloading an entire music album in less than two seconds. With more data moving today than ever before, the communications infrastructure must be able to handle the dual challenges of providing higher data volumes and higher transmission rates. Given that the last of the second generation TDRS was launched a decade ago, NASA is getting ready to deploy a third generation of spacecraft; TDRS K, L, and M, to ensure vital operational continuity.

Built on the proven and robust Boeing 601 bus, the upcoming third generation spacecraft will continue the TDRS legacy of having ample power, smart redundancies and unsurpassed ground support to provide continuous data services twenty-four hours a day, every day of the year.

The addition of the third generation of spacecraft will replenish the constellation and allow NASA's Space Network to continue to provide fast and reliable services to its user community. TDRS K, L and M are ensuring that that the critical lifeline of space-to-ground communication support will be available for many years to come.